



# CARRIER TAPE EQUIPMENT

## PRODUCT OVERVIEW



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# MÜHLBAUER GROUP AT A GLANCE

## MÜHLBAUER'S BUSINESS UNITS AND SITES

The Muehlbauer Group is a **German high-tech company** that is known worldwide for its innovative solutions in the field of automated production. With over 40 years of experience, Muehlbauer develops customized technologies for the future of industry and everyday life. The company is the secret driving force behind many developments that make our modern lives safe and efficient.

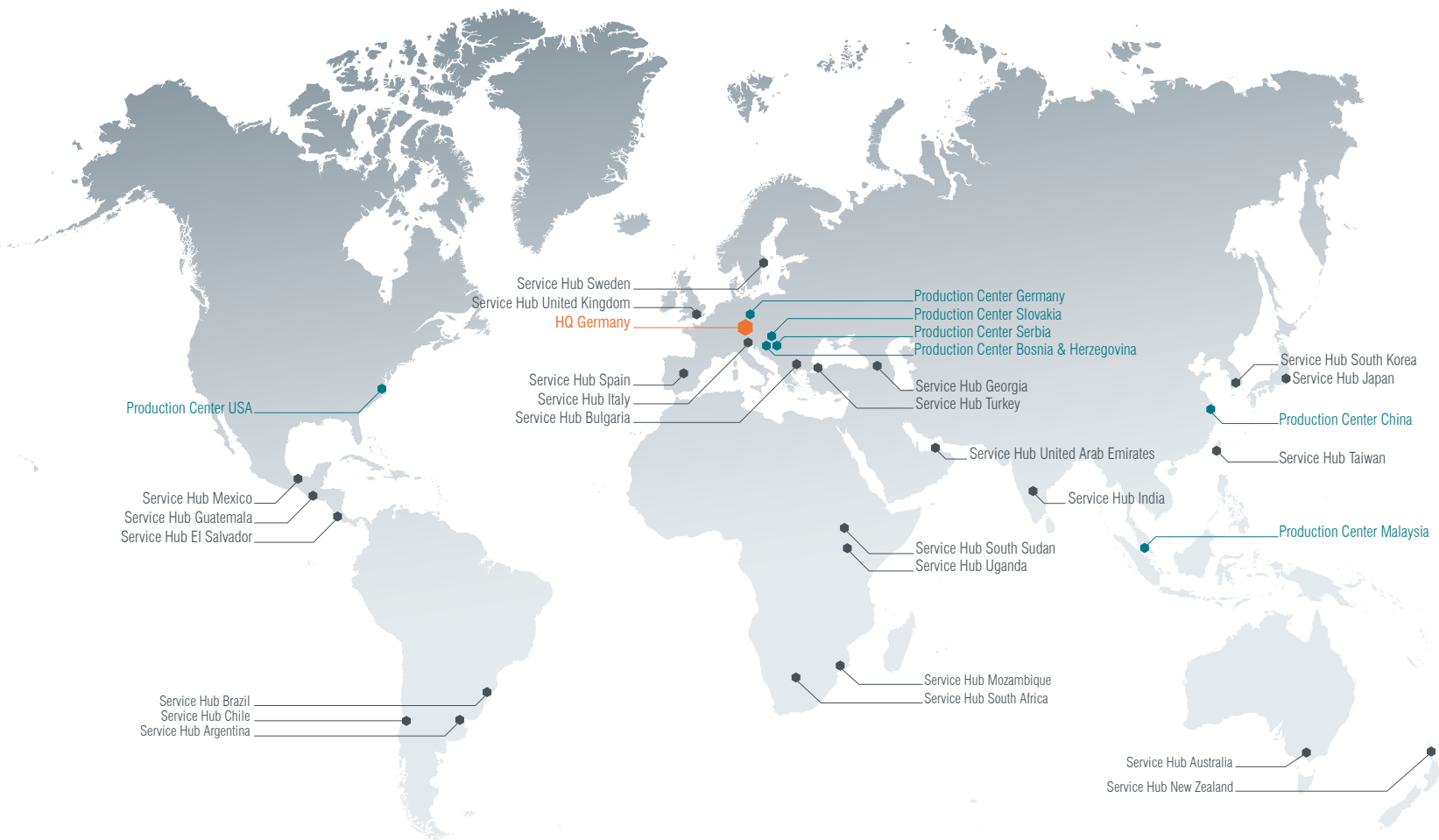
Since its foundation in 1981 in Roding, Bavaria, Muehlbauer has stood for maximum precision. The **Muehlbauer Parts & Systems** business unit consists of the company's own precision parts production with a state-of-the-art electroplating facility. All components for machines and other products are manufactured here in-house – individually and, if necessary, overnight! Our **MPS** makes us extremely agile and independent.

Our **AUTOMATION** division goes far beyond the assembly of customized production systems! We provide intelligent software solutions for the automation of different production steps and drive Industry 4.0 forward. We are passionate about serving 90 % of the global RFID market with our high-speed bonders, and have achieved market leadership in the semiconductor industry with our unique die sorting technology.

Our newest and currently most dynamic division **ATECH – Advanced Energy Technologies** – brings unique machine requirements to series production. In the field of e-mobility, we offer highly efficient production lines for the manufacture of pouch cells and prismatic cells for lithium-ion batteries, as well as MEAs & stacks for fuel cells. Our newly built **ATECH Giga Center** with dry room provides optimal conditions for gigascale manufacturing.

Our **TECURITY®** division is the leading specialist when it comes to implementing innovative security systems for identifying and verifying documents and people. For example, we manufacture systems for the production of chip cards, IDs and passports or supply eGates and self-registration kiosks and the associated software for airports and border crossings. With more than 30 years of experience and over 300 successfully implemented ID projects worldwide, we offer our customers absolute expertise and trust at the highest level.

More than 4,000 employees at over 30 locations worldwide ensure that Muehlbauer's visions become reality around the globe. Sustainability, quality and unwavering trust in partnerships are the pillars on which our company has built its success story. Muehlbauer is not just a service provider, but a **creative problem solver** that shapes the future every day with innovative ideas and technological excellence.



Muehlbauer  
Bosnia & Herzegovina



Muehlbauer  
China



Muehlbauer  
Germany



Muehlbauer  
Malaysia



Muehlbauer  
Serbia



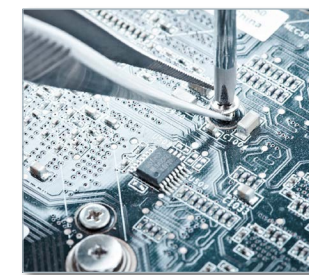
Muehlbauer  
Slovakia



Muehlbauer  
USA



**MPS**  
Precision Parts & Surface Engineering



**AUTOMATION**  
Production Equipment & Systems



**MB ATECH**  
Battery & Fuel Cell Technologies



**WORLD OF TECURITY®**  
Government & Technology Solutions



# MANUFACTURING EXECUTION SYSTEMS



## MB MCES

PERSONALIZATION MANAGEMENT SYSTEM

MB MCES is a personalization management software that integrates incoming data with product definitions and controls the associated physical and electronic personalization processes. MB MCES handles personalization data from a variety of different input methods and formats.



## MB INCAPE

INTEGRATED PRODUCTION MANAGEMENT SOFTWARE

MB INCAPE is Mühlbauer's Production Management Software for producing and personalizing electronic cards and documents, such as ID cards, ePassports, Driver's Licenses, EMV or GSM cards. By combining data management, production control, and material management, the system enables highly automated processes. MB INCAPE processes customer- and application-specific production, personalization, quality control and document delivery scenarios with highest solution flexibility.



## MB PALAMAX®

TOTAL PROCESS TRANSPARENCY

MB PALAMAX®, Mühlbauer's Smart Factory solution, supports various applications, including ID and document production, personalization, semiconductor backend, and eMobility shop floors. It monitors production data and makes it available for later processing, visualization and statistical analysis. This allows you to identify and implement efficiency improvements in your production system.



## MB TOOL LEADER

CONNECTOR BETWEEN SYSTEMS

MB TOOL LEADER is a software package consisting of several applications that serves as a reliable link between the systems involved in the production process. With MB TOOL LEADER, you can easily monitor and control the entire process chain – from incoming orders to final precision parts. Real-time machine monitoring ensures an automated production process. Production errors can be detected and resolved early on. MB TOOL LEADER reduces machine downtime and thus increases machine productivity by up to 20 percent.



## MB EXPERT SYSTEM

RESOURCE PLANNING

The MB Expert system is a specialized tool for planning, scheduling and optimizing production on the production floor. This resource planning software helps organizations automate and manage core business processes to optimize performance while taking into account production articles, orders and human resources.

### FEATURES & ADVANTAGES



Configurable workflow steps regarding personalization, quality assurance & issuance



Fully-automated processing & production management



Scalability regarding different documents, machines & personalization locations



Flawless integration of Mühlbauer's material management system (MB INCAPE WAREHOUSE)



Connection to card / document management systems via web service, database, file-based interface



Standard interface to personalization machines with integration of third-party machines possible



Integration of MB USER MANAGEMENT



Full coverage of production control requirements (security industry & EMV standards)



Seamless connection to MB PALAMAX® & MB DATA PREPARATION



Simplified administration due to web-based operator clients



Monitoring of real-time production performance



Seamless tracking of documents from point of production to issuance



Statistical tool analyzes collected data & provides customized OEE statistics



Tool which enables the remote operation of machines on the shop floor from a control centre



Tool which increases effectiveness & efficiency so that production becomes more profitable



Enables production engineering to prepare & test a repeatable factory set-up. Factories can switch between products within minutes.





# CT 8/24 D

## ROTARY TAPE FORMING SYSTEM WITH DUAL-ROW OPTION

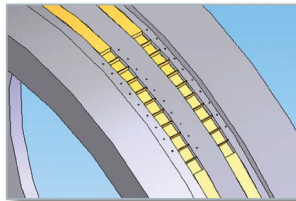
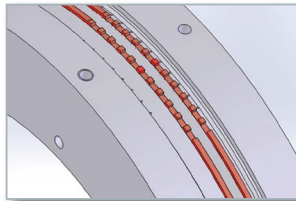
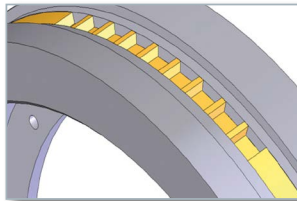
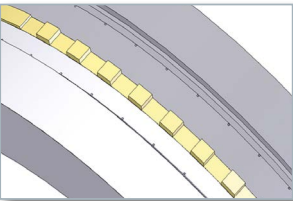
The CT 8/24 D is a rotary forming carrier tape system with a throughput of up to 600 meters per hour, depending on cavity size, positive or negative forming and used material / thickness.

The CT 8/24 D offers a tape range from 8 mm to 24 mm for both positive and negative forming. Dual forming is possible for the following tape size ranges: 2 x 8 mm, 2 x 12 mm.



### KEY FEATURES

- One machine for all applications on rotary forming (positive or negative)
- Well-proven, in-house developed dual-row forming system
- Suitable for high volumes



## FEATURES & ADVANTAGES

### DESIGN

- Welded steel frame with aluminium front & table plate on all workstations
- Easily accessible control electronics
- Automatic tape wind-on and production control
- Menu-driven software (different languages)
- Mechanism controlled by PLC
- Central control & programming unit
- Integrated vacuum pump
- CE-conformity

### WORKSTATIONS

- Buffer station for wind-off
- Temperature-controlled forming station
- Buffer station with control unit for cutting process
- Tape width trimming cutting station with waste wind-on
- Buffer station
- Punching unit
- Split cutting station
- Buffer station with control unit for wind-on unit
- Wind-on on 200 mm crosswinder

### OPTIONS

- Mühlbauer vision for 100 % quality control
- Multi-level / crosswinding wind-on up to 200 mm
- Tape cleaning station

### SPOOLING SYSTEMS

- Automatic, sensor-controlled wind-off
- Different wind-on speeds for winding directions

### TAPE MATERIALS

- Most thermo-formable materials available on the market (pre-slit thermo plastics)

### TAPE WIDTH RANGE

- Single: 1 x 8 mm, 1 x 12 mm, 1 x 16 mm, 1 x 24 mm
- Dual: 2 x 8 mm, 2 x 12 mm

### FACILITIES

- Power supply: 25 A / 4.7 kW
- Compressed air supply: min. 6 bar (90 psi), oil- and waterfree

### ENVIRONMENTAL CONDITION

- Room temperature: 23 °C ± 5 °C
- Humidity: 50 % ± 10 %

### DIMENSIONS

- Height: 2315 mm
- Length: 1900 mm
- Depth: 905 mm
- Weight: 530 kg

### THROUGHPUT

- Single row 300 up to meter / hour depending on cavity size & used material
- Dual row up to 600 meter / hour depending on cavity size & used material

DUAL ROTARY SYSTEM

LINEAR SYSTEM

LASER MARKING

TAPE DEFINITION

CARRIER TAPE DIMENSIONS

MÜHLBAUER VISION

IN-HOUSE PRODUCTION

DIE SORTING

PRODUCT PORTFOLIO



# CT 12/88 D

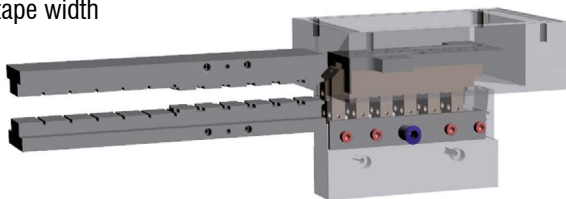
## LINEAR TAPE FORMING SYSTEM FOR BASIC PRODUCTION

The linear carrier tape forming system CT 12/88 D uses a common method of tape forming: First, the tape is pre-heated, and then the forming tools are applied stroke by stroke. With the optional “Deep Pocket Stamping” feature, a cavity depth of 30 mm can be achieved. The maximum throughput of this linear forming system is 330 meters per hour. This linear forming system has a maximum throughput of 330 meters per hour. This depends on the cavity size, the material used, and the thickness.



### KEY FEATURES

- One machine for all applications on linear forming
- 4<sup>th</sup> generation, meeting all current production demands
- Low tooling costs with easy structure
- Up to 30 mm cavity depth through optional “Deep Pocket Stamping”
- Able to produce 2 output rows from 12 mm tape width until 44 mm tape width



## FEATURES & ADVANTAGES

### DESIGN

- Welded steel frame with aluminium front & table plate on all workstations
- Easily accessible control electronics
- Automatic tape wind-on & production control
- Menu-driven software (different languages)
- Mechanism controlled by PLC
- Central control & programming unit
- CE-conformity

### WORKSTATIONS

- Buffer station for wind-off
- Water-cooled forming station
- Buffer station with control unit for wind-on unit
- Wind-on
- Multi-level / crosswinding wind-on up to 400 mm

### OPTIONS

- “Deep Pocket Stamping”
- Cutting station for tape width trimming for 12 mm & special 16 mm & 24 mm tapes
- Air booster for sharper pocket forming walls

### SPOOLING SYSTEMS

- Automatic, sensor-controlled wind-off & wind-on system

### TAPE MATERIALS

- Most thermo-formable materials available on the market (pre-slit thermo plastics)

### TAPE WIDTH RANGE

- Single: 12, 16, 24, 32, 44, 56, 72 & 88 mm
- Dual: 2 x 12 mm, 2 x 16 mm, 2 x 44 mm

### PROCESS PARAMETERS

- Max. cavity depth: 30 mm
- Optional “Deep Pocket Stamping”
- Punch pitch: 4,8,12,16 & all pitch increments of 4 mm until 48 mm
- Standard punch stroke: up to 128 mm

### FACILITIES

- Power supply: 16 A / 4.7 kW
- Compressed air supply: min. 6 bar (90 psi), oil- and waterfree

### ENVIRONMENTAL CONDITION

- Room temperature: 23 °C ± 5 °C
- Humidity: 50 % ± 10 %

### DIMENSIONS

- Height: 2255 mm (with signal lamp)
- Length: 3324 mm
- Depth: 656 mm
- Weight: Approx. 700 kg

### THROUGHPUT

- Up to 330 meters / hour depending on cavity size & used material / thickness

DUAL ROTARY SYSTEM ☐

LINEAR SYSTEM ☒

LASER MARKING ☐

TAPE DEFINITION ☐

CARRIER TAPE DIMENSIONS ☐

MÜHLBAUER VISION ☐

IN-HOUSE PRODUCTION ☐

DIE SORTING ☐

PRODUCT PORTFOLIO ☐





# CT-LM/D1

## LASER MARKING

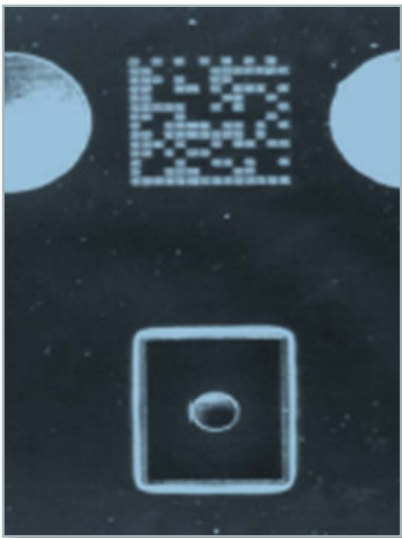
The Carrier Tape Laser Marking machine uses its advanced system to precisely laser-mark Carrier Tapes with individual data matrix codes.

With the alternative CT-D1 configuration, it is possible to laser vacuum holes with a diameter of up to 0.08 mm into the bottom of the cavity. Both machines can be operated in line.



### KEY FEATURES

- High precision DMC dot size of 0.1 mm
- Accurate vision system for checking position and gradeability
- In-Line capability
- D1-hole size down to 0.08 mm



## FEATURES & ADVANTAGES

### SIZES OF THE DMC CODES

- DMC Code size from 10 x 10 to 18 x 18 dots
- Dotsize of 0.1 mm
- DMCs between transport holes and / or between the cavities (depending on the size of the cavity and pitch)

### WORKSTATIONS

- Buffer station for wind-off
- Laserstation for DMC engraving
- Vision system for checking position and gradeability
- Cutting station for automated cutting
- Wind-on system for film reels or crosswinded reels up to 200 mm in width

### SPOOLING SYSTEMS

- Automatic, sensor-controlled wind-off & wind-on system

### TAPE MATERIALS

- Most thermo-formable PC and PS materials available on the market

### TAPE WIDTH RANGE

- 8 mm - 24 mm

### FACILITIES

- Power Supply: 16 A / 2.0 kW

### ENVIRONMENTAL CONDITION

- Room temperature: 23 °C ± 5 °C
- Humidity: 50 % ± 10 %

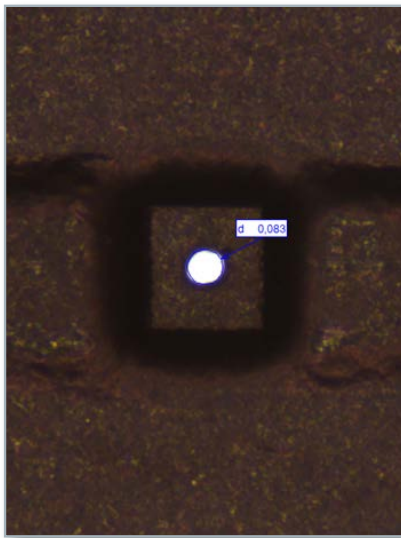
### DIMENSIONS

- Height: 1910 mm
- Length: 1233 mm
- Depth: 87 mm
- Weight: 263 kg

### THROUGHPUT

- Up to 45.000 UPH, depending on the DMC size and pitch

## OPTION: D1 HOLE LASERING



### D1 HOLE SIZES

- Min. D1 hole size of 0.08 mm
- Max. D1 hole offset of 0.01 mm
- Min. pitch of 2 mm

### WORKSTATIONS

- Buffer station for wind-off
- Vision system for pre- and post-inspection
- Laser station for D1 hole cutting
- Wind-on system for film reels or crosswinded reels up to 200 mm in width

### THROUGHPUT

- up to 15,000 UPH, depending on the hole size and pitch

DUAL ROTARY SYSTEM ☐

LINEAR SYSTEM ☐

LASER MARKING ☒

TAPE DEFINITION ☐

CARRIER TAPE DIMENSIONS ☐

MÜHLBAUER VISION ☐

IN-HOUSE PRODUCTION ☐

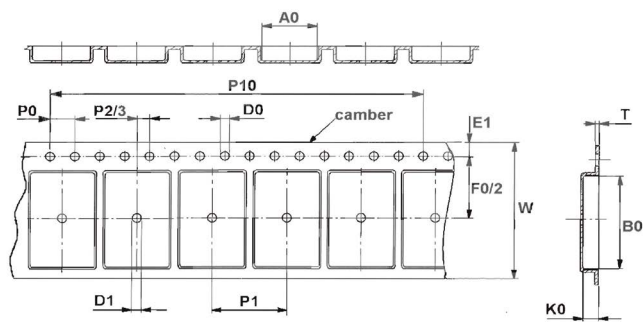
DIE SORTING ☐

PRODUCT PORTFOLIO ☐

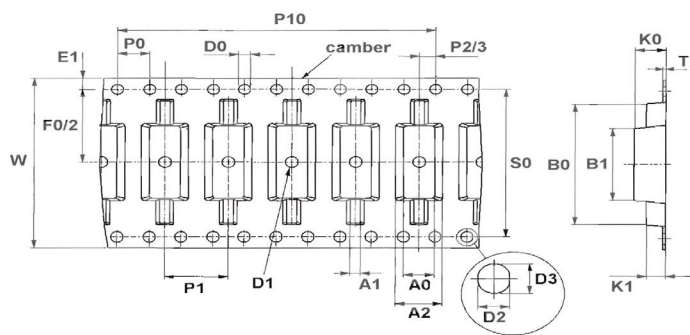


# TAPE DEFINITION

EXAMPLE FOR ROTATION TAPE



EXAMPLE FOR LINEAR TAPE



LEGEND

- A0** Pocket length (specified with A1, A2, ...; x-direction)
- B0** Pocket width (specified with B1, B2, ...; y-direction)
- K0** Pocket depth (specified with K1, K2, ...)
- W** Tape width
- T** Tape thickness
- E1** Distance from transport hole to cutting edge
- F0** Distance from center of pocket (center of B0) to center of transport hole (y-direction)
- F2** Distance from center of pocket hole to center of transport hole (y-direction)
- S0** Distance center around transport hole to center oval transport hole (y-direction)
- P0** Distance between two transport holes
- P1** Distance from pocket to pocket
- P2** Distance from center of pocket (center of A0) to center of transport hole (x-direction)
- P3** Distance from center of pocket hole to center of transport hole (x-direction)
- P10** Distance between ten transport holes
- D0** Transport hole diameter
- D1** Pocket hole diameter
- D2** Second transport hole diameter (x-direction)
- D3** Second transport hole diameter (y-direction)

DEFINITION OF CAMBER (CURVE OF TAPE)

- camber (single reel): ≤1.0 mm / 250 mm
- camber (crosswinding): ≤2.0 mm / 250 mm

# CARRIER TAPE DIMENSIONS

EXAMPLE FOR ROTATION TAPE

Ident number	Tool on stock	W	Ao	Bo	K0	P	t	Contour 0/1	
LO-53	MB SP 35/3-2/1,0	35	4,10	2,10	1,00	6,65	0,20	Spacer	
LO-56	MB SP 35/2-1/2,0	35	4,00	2,00	2,00	2,66	0,20	Spacer	
LO-1973	MB SP 35/2-3/1,15	35	4,03	1,03	1,12	8	0,20	Spacer	
LO-194	MB SP 35/3-3/1,2	35	4,40	1,30	1,20	6,65	0,20	Spacer	
LO-1843	MB SP 35/4-5/0,8	35	5,00	2,00	1,00	6,65	0,20	Spacer	
LO-54	MB SP 35/3-1/0,8	35	7,5	2,00	0,8	15	0,20	Spacer	

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IN-HOUSE PRODUCTION

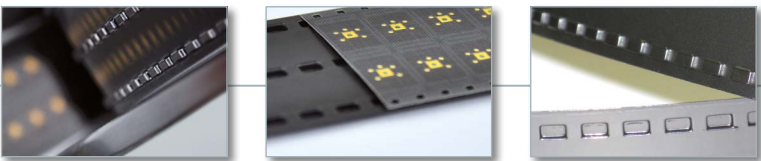
DIE SORTING

PRODUCT PORTFOLIO

## >> SPACER TAPE TO PROTECT THE IC MODULE ON THE REEL

- Available material: polycarbonate
- Conductive
- Softening temperature: 154 °C

## >> CUSTOMIZED SOLUTIONS AVAILABLE

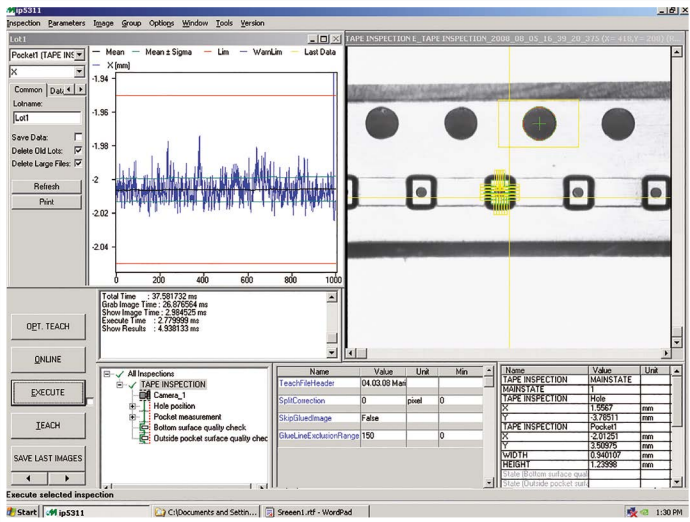




# MÜHLBAUER VISION

## FOR 100 % QUALITY OUTPUT

To ensure 100% quality output, all our systems are available with the optional Mühlbauer Vision feature, which displays all inspection results and recognizes any deviations in the P2, F0, A, and B dimensions.



### YOUR ADVANTAGES

- Immediate identification of quality problems
- Increased throughput & productivity
- Improved cost of ownership
- Highest quality standards
- No influence on equipment or machine throughput
- Less waste of material due to the fast failure identification

### MATRIX SCAN

The matrix scan is another means of ensuring consistent quality, regardless of pocket size or tape width. Mühlbauer systems provide customers with the confidence they need to deliver superior tapes and ensure the utmost security when transporting highly sensitive components.

# IN-HOUSE PRODUCTION

## COMPETENCES IN CARRIER TAPE PRODUCTION

AT MÜHLBAUER, WE ALSO PRODUCE CARRIER TAPES IN OUR OWN FACILITIES. WE OFFER:

### SMALL & THIN BARE DIE GEOMETRIES

- Incl. vacuum hole up to 0.08 mm
- 2.0 mm pitch
- 8.0 mm tape width

### CUSTOMIZED SOLUTIONS

- Contact us for any specific carrier tape requirements. Our experts will be glad to assist you.

### PRODUCTION CENTERS IN MALAYSIA AND GERMANY

### HUGE PORTFOLIO

- Positive or negative forming
- Linear forming
- Spacer tape for IC modules
- Single or multi-row

### OPEN TOOL LIST

- For more information on our specific products, please visit our website: [www.muehlbauer.de/carrier-tape](http://www.muehlbauer.de/carrier-tape)



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# SYNERGIES WITH DIE SORTING

A PERFECTLY MATCHING SOLUTION FOR CARRIER TAPE & DIE SORTING

IN THE AREA OF DIE SORTING, MÜHLBAUER IS THE ONLY COMPANY WORLDWIDE

- which can handle dies as small as 0.2 x 0.2 mm and down to 50 µm thickness with the highest level of precision & speed
- offering die sorting equipment with up to 55.000 UPH (including 100 % vision inspection)
- offering an “all in one” platform solution for different kinds of applications

TRUST IN THE MOST EXPERIENCED SUPPLIER IN TERMS OF PRECISION, SPEED AND QUALITY!



MÜHLBAUER NOW LASERS BARCODES ON CARRIER TAPE.  
WE INVENTED A LASER STATION TO MARK  
CARRIER TAPE ON DS MACHINES!

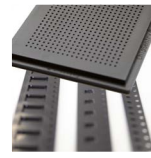
## SORTING INTO



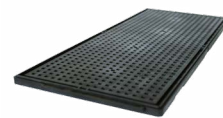
Carrier Tape



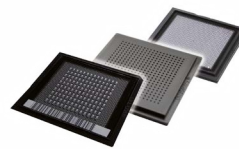
Reconstructed wafer



Combined solution



Jedec tray



Waffle Pack / Gel Pack

We also can provide customized solutions, please feel free to contact our carrier tape experts.

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35 YEARS  
MB CARRIER TAPE



# PRODUCT PORTFOLIO

YOUR ONE-STOP-SHOP TECHNOLOGY PARTNER

## AUTOMATION

### CARDS & ePASSPORTS

- IC Module Production
- Card Body & Smart Card Production
- Holderpage & Booklet Production
- Card & ePassport Personalization
- Packaging & Mailing

### RFID / SMART LABEL

- Antenna Production & Inlay Assembly
- Converting
- Personalization

### SEMICONDUCTOR BACKEND

- IC Module Production
- Carrier Tape Production
- Die Sorting

### INDUSTRIAL INSPECTION SYSTEMS

- Packaging
- Metal Working
- Special Solutions

### FUTURE TECHNOLOGIES

- Concentrator Solar Technology
- Flexible Solar Cell Technology
- Solar Panel Technology
- E-SIM PERSONALIZATION
- LED Technology

## TECURITY®

- ID Card Solution
- ePassport Solution
- MB IDVERSO® Border Management Solution
- Driver's License & Vehicle Registration Solution
- Production Facilities

## PARTS & SYSTEMS

- Precision Parts
- Surface Engineering

### CONSULTING

- Identification of Customer Requirements
- Planning & Design
- Implementation
- Ongoing Operations

### SERVICE

- Worldwide Locations for Service & Support
- Worldwide Spare Parts Supply
- Reaction Time & Full Service Contracts
- Service & Maintenance Management
- Updates & Upgrades
- Teleservice, Remote Access & Hotline (24 hours)
- Training & Support on Different Levels
- Production & Administration Support

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**Mühlbauer**  
High Tech International

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